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IDEALIST

IDEA 0580-67

Copy 6 of 7

25 SEP 1967

MEMORANDUM FOR: Director of Special Activities

SUBJECT: Camera Equipment

1. This memorandum contains five recommendations for your approval. Such recommendations are contained in paragraph 5.

2. At the present time four types of cameras are included in the inventory of IDEALIST mission equipments. Following is a brief description of each, together with their advantages/disadvantages.

a. The "B" Configuration, manufactured by HYCON Corporation, is a high resolution, large format, general coverage reconnaissance framing camera designed to provide detailed information over an extremely large area. Completely automatic in operation, the unit employs a self-contained control system providing five modes of operation, selectable in flight.

Advantages:

- (1) Horizon to horizon photography.
- (2) Sufficient film to provide approximately 2,000 miles of flight line photography.
- (3) Ideal for search reconnaissance of areas about which little is known.
- (4) Extremely high degree of reliability.

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TOP SECRET

GROUP 1
Excluded from automatic
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TOP SECRET
IDEALIST

IDEA 0580-67
Page 2

Disadvantages:

(1) Inadequate resolution to provide technical intelligence e.g. 17 inches at Nadir and 38 inches 15 NM from Nadir.

<u>Distance from Flight Line</u>	<u>Resolution</u>
Nadir	17 inches
10 NM	27 inches
20 NM	49 inches
30 NM	63 inches
40 NM	87 inches

b. The Delta III Configuration, manufactured by ITEK Corporation, consists of twin panoramic cameras positioned in a V-configuration to provide a 26 degree stereo angle. The cameras scan across the line of flight in counter-direction to each other. Operation of the cameras is controlled by the pilot via the Mark III hand control.

Advantages:

(1) Resolution of 9 to 18 inches is adequate to provide technical intelligence of selected targets.

(2) Sufficient film to provide approximately 3600 nautical miles of flight-line photography.

Disadvantages:

(1) The relatively narrow swath width (16 nautical miles) is not adequate for the type of

IDEALIST
TOP SECRET

TOP SECRET
IDEALIST

IDEA 0580-67
Page 3

photo reconnaissance now being accomplished by Project IDEALIST.

c. The "H" Configuration, manufactured by HYCON Corporation, is a high altitude framing camera designed to provide high resolution photography of selected targets. An oblique mirror rotates to aim at the target and the entire magazine rotates in synchronization with the mirror so that the image is not skewed on the film.

Advantages:

- (1) Can be used to photograph targets defended by surface-to-air missiles.
- (2) Provides extremely high resolution photography of targets located near the flight line.

Disadvantages:

- (1) Limited film supply - approximately one hour and fifty minutes of continuous operation in mode five.
- (2) Extremely narrow swath width at sighting angles of less than 60 degrees (see paragraph (3) below).
- (3) Inadequate resolution to provide technical intelligence of targets located more than 25 nautical miles from the flight line. Swath width and resolution are listed below for various oblique aiming angles:

IDEALIST
TOP SECRET

TOP SECRET
IDEALIST

IDEA 0580-67
Page 4

<u>Aiming Angle</u>	<u>Distance from Flight Line</u>	<u>Resolution</u>	<u>Swath Width</u>
0°	0	5 inches	2.6 NM
20°	4.19 NM	5 - 8 inches	3.1 NM
30°	6.65 NM	7 - 10 inches	3.5 NM
40°	9.67 NM	9 - 12 inches	4.5 NM
50°	13.73 NM	11 - 16 inches	6.7 NM
60°	19.95 NM	14 - 21 inches	10.9 NM
70°	31.65 NM	19 - 39 inches	25.0 NM

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IDEALIST
TOP SECRET

TOP SECRET
IDEALIST

IDEA 0580-67
Page 5

3. Discussion:

a. The "B" Configuration was the ideal camera in the early days of the IDEALIST program. Its horizon-to-horizon coverage permitted location and identification of previously unknown targets at large distances from the aircraft track, and its resolution (near NADIR) was sufficient to permit determination of air order of battle, runway dimensions, etc. In some areas of the world there no longer exists a requirement for Project IDEALIST to acquire search photography, since this requirement is apparently being satisfied by unmanned reconnaissance vehicles. The present requirement for Project IDEALIST, as understood by the undersigned, is to obtain high resolution photography of selected targets to provide technical intelligence as well as provide strategic intelligence by detecting changes in order of battle which have taken place since the targets were last photographed.

b. The Delta III camera can provide this high resolution, but because of its narrow swath width cannot cover a sufficient number of targets on any given flight line. In addition, precise adherence to the planned flight route is mandatory if all programmed targets are to be covered.

c. The "H" camera is a special purpose camera, adequate for the purpose for which it was designed, but should not be considered as a substitute for either the "B" Configuration or the Delta III camera in obtaining near vertical photography.

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4. Conclusions:

a. The "H" camera and will

25X1D

IDEALIST
TOP SECRET

TOP SECRET
IDEALIST

IDEA 0580-67
Page 6

satisfy the present requirement for special purpose camera equipment.

b. The present IDEALIST inventory of four "B" cameras and four Delta III cameras is inadequate.

c. Instead of procuring additional "B" and Delta III cameras to replace those lost through attrition, an improved camera system with the following capabilities should be added to the IDEALIST inventory.

(1) Minimum lateral coverage of 50 nautical miles.

(2) Minimum forward coverage of 2000 nautical miles.

(3) Resolution of approximately 9 inches at NADIR and 24 inches at 25 nautical miles from flight line.

5. It is recommended that:

a. The ITEK 24 inch rotating bar panoramic camera (built for the drone program) be flight tested in the IDEALIST vehicle to determine if its performance meets design specifications.

b. Deputy for Research and Development determine whether the film supply of the Camera described in paragraph 5a above, can be increased to provide 2000 nautical miles forward coverage.

c. If answers to paragraphs 5a and 5b are affirmative, the ITEK rotating bar camera be procured and the "B" configuration and Delta III cameras be removed from the IDEALIST inventory.

d. If the rotating bar camera does not have the capabilities listed in paragraph 4b above, efforts be

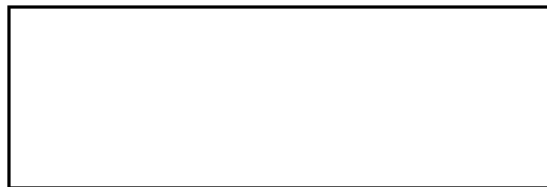
IDEALIST
TOP SECRET

TOP SECRET
IDEALIST

IDEA 0580-67
Page 7

directed toward development of a new camera system with those capabilities.

e. The third "H" camera be modified to the same configuration as the "H" cameras presently being used by SAC and the Agency. The modification includes, as a minimum, gyro stabilization and the addition of mode 5 (four position). This will provide three "H" cameras available for NRO use (either SAC or Agency) wherever the requirement may exist.



Deputy for Operations, OSA

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CONCUR:

SIGNED



Deputy for Research and Development

SIGNED

Deputy for Materiel

The recommendations contained in paragraph 5 are approved:



Director of Special Activities

IDEA/OSA/ (22 Sep 67)

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